IN THE SPECIFICATION:

Please amend the specification as follows:

Please substitute the paragraph beginning at page 2, line 7, with the following.

-- In order to raise the resolution of a projection exposure apparatus, it is necessary to enlarge the numerical aperture (NA) of the projection optics and to shorten the exposure wavelength thereof. However, making the NA of the projection optics greater than a certain value is difficult in terms of the structure of the optical system. Further, when the NA of the projection optics is enlarged, the utilizable focal depth decreases and, as a result, it is difficult to realize a resolution that is possible in theory. For this reason, it is especially required that the wavelength of the exposing light be reduced in order to raise the resolution of the projection exposure apparatus. --

Please substitute the paragraph beginning at page 2, line 21, and ending on page 3, line 11, with the following.

-- A KrF excimer laser having a wavelength of 248 nm and an ArF excimer laser having a wavelength of 193 nm have been proposed and put into practice as exposure light sources. There is also a demand for a light source having a shorter wavelength on the order of 180 nm or less, especially, an F_2 laser of wavelength 157.6 nm. When the wavelength of exposing light is reduced, however, absorption of the light by the optical components increases and hence, there is a limitation upon the types of glass materials that can be used as the optical components. For example, CaF_2 crystal (fluorite) alone is known as a practical refraction optical material that can

be used for dealing with short-wavelength light. As a consequence, it is difficult to fabricate an optical system in which various types of aberration are limited to desired values through use solely of a refraction optical system employed heretofore in projection optics. --

Please substitute the paragraph beginning at page 3, line 12, with the following.

-- Further, a laser light source ~~of~~ <u>having a</u> wavelength <u>of</u> 200 nm or less has a certain width even if the region of <u>the</u> oscillation wavelength is narrowed. In order to maintain good contrast and <u>to</u> project a mask pattern, therefore, it is required that chromatic aberration be reduced to the pm (picometer) order. --

Please substitute the paragraph beginning at page 3, line 18, and ending on page 4, line 2, with the following.

-- A reflection optical system utilizing a concave reflecting mirror generally is used as an optical system that reduces chromatic aberration. Further, a reflection and a refraction-type optical system comprising a combination of a reflection optical system and a refraction optical system is capable of reducing various ~~aberration~~ <u>aberrations</u> inclusive, especially, of chromatic aberration, without inviting an increase in the number of lenses. A demagnifying projection optical system of <u>a</u> reflection-diffraction type has, therefore, been proposed in order to eliminate chromatic aberration produced by the range of wavelengths possessed by laser light. --

Please substitute the paragraph beginning at page 4, line 5, with the following.

-- A projection optical system of the type disclosed in the specification of Japanese Patent Application Laid-Open No. 8-334695, for example, is a so-called off-axis optical system in which an area offset from the ~~optic~~ optical axis is used as the optical path, the off-axis arrangement affords better image quality because there is less of a decline in quantity of light and no shielding of image-forming light flux. It is also easier to fabricate the various optical members. --

Please substitute the paragraph beginning at page 4, line 22, with the following.

-- Furthermore, the specification of Japanese Patent Application Laid-Open No. 2001-27727 describes a reflection-refraction-type optical system as a projection optical system using reflection-refraction-type optics. This proposed optical system has a first image-formation optical system of a reflection-refraction-type for forming an intermediate image of a first surface, and a second image-formation optical system of a refraction type for forming the final image of the first surface on a second surface, telecentrically, based upon light from the intermediate image. This is an optical system referred to generally as a single-barrel system. Since this projection optical system has the construction of a reflection-refraction-type optical system, the projection area of a mask pattern formed on the wafer is formed at a position off-center with respect to the center of the projection optics. Physically speaking, the center of the projection optics is the center of the optical components used in the refraction optics or the center of the ~~optic~~ optical axis of the optical system. It is the ~~optic~~ optical axis AX indicated in the specification of Japanese Patent Application Laid-Open No. 2001-27727. Further, since an

intermediate image resides in the projection optics and the number of times of the reflection is an even number, the visual-field area on the side of the mask also is formed at a position that is off-center on the same side as the pattern projection area mentioned above. --

Please substitute the paragraph beginning at page 6, line 9, with the following.

-- With regard to achieving an improvement in alignment precision, the following schemes are available for dealing with the alignment of the wafer and reticle in ~~a~~ an exposure apparatus: --

Please substitute the paragraph beginning at page 6, line 21, and ending on page 7, line 10, with the following.

-- An example of the TTL scheme is a method of detecting an alignment mark on the wafer using light having an alignment wavelength of non-exposing light via a projection optical system referred to as TTL-AA (Through The Lens Auto Alignment). The TTL-AA scheme is advantageous for the following reason: The amount by which the wafer stage is driven at the time of alignment measurement and at the time of exposure is small because the length of a line (a so-called baseline) connecting the ~~optic~~ optical axis of the projection optics and the TTL-AA ~~optic~~ optical axis is made very short. This makes it possible to suppress measurement error that occurs owing to a change in the distance between the ~~optic~~ optical axis of the projection optics and the ~~optic~~ optical axis of the TTL-AA system caused by a change in the environment

surrounding the wafer stage. In other words, the advantage is a small fluctuation of the baseline. --

Please substitute the paragraph beginning at page 7, line 11, with the following.

-- However, when the exposing light is made to be short-wavelength light of which the light source is an ArF or F_2 laser, the glass material that can be used is limited. Consequently, correction for chromatic aberration with respect to the alignment wavelength of the projection optics is difficult. Accordingly, an off-axis scheme [referred to as an "Off-axis Auto-alignment (OA) detection scheme" below] that is not susceptible to the effects of chromatic aberration in the projection optical system is important. --

Please substitute the paragraph beginning at page 7, line 21, and ending on page 8, line 4, with the following.

-- In OA detection, a projection optical system does not intervene. This is advantageous in that a light source of any wavelength or a light source having a broad wavelength region can be used. One example of an advantage of using a light source having a broad wavelength region is that the effects of thin-film interference can be removed from a resist with which the wafer is coated. Accordingly, it can be said that the OA detection scheme, which is capable of correcting for aberration, is an important alignment scheme with regard to light having a broad wavelength region. --

Please substitute the paragraph beginning at page 8, line 5, with the following.

-- In a case ~~where~~ wherein alignment of the reticle and wafer is carried out using the OA detection scheme in which the relationship between an examined position and an actual exposure position is invisible, a so-called baseline quantity is obtained in advance. This is the spacing between the center of measurement of the alignment detection system and the center of the projected image of the pattern on the reticle (the center of exposure). The amount of offset from the measurement center of the alignment mark on the wafer is detected by an alignment system of the OA detection system and the wafer is moved a distance obtained by correcting the amount of offset by the baseline amount, whereby the center of the shot area is positioned accurately at the center of exposure. In the process of using the exposure apparatus, however, there are instances where the baseline quantity fluctuates gradually owing to aging. If such a change in baseline occurs, the alignment precision (overlay precision) declines. Accordingly, it is necessary to perform periodically a baseline check to accurately measure the spacing between the center of measurement of the alignment sensor and the center of exposure. --

Please substitute the paragraph beginning at page 10, line 23, and ending on page 11, line 12, with the following.

-- A baseline quantity BL is obtained by calculating the difference X3-X4. The baseline quantity BL is a reference quantity for when the alignment mark on the photosensitive substrate 8 is subsequently aligned by the alignment sensor 16 and is fed to a point directly beneath the projection optics 7. That is, let XP represent the spacing between the center of one shot (the area

to be exposed) on the photosensitive substrate 8 and the alignment mark on the photosensitive substrate 8, and let X5 represent the position of the wafer stage 10 when the alignment mark on the photosensitive substrate 8 has been aligned with the index mark of the alignment sensor 16. In order to achieve agreement between the center of the shot and the center C of the reticle, it will suffice to move the wafer stage 10 to a position expressed by the following:

(X5 - BL - XP) or (X5 - BL + XP). --

Please substitute the paragraph beginning at page 11, line 13, with the following.

-- Thus, by merely sensing the position of the alignment mark on the photosensitive substrate 8 using the alignment sensor 16 of the OA detection system and then feeding in the wafer stage 10 by a fixed amount that is related to the baseline quantity BL, the pattern on the reticle R can immediately be overlaid accurately on the shot area of the photosensitive substrate 8 to carry out exposure. It should be noted that although only a single dimension has been considered here, in actuality, it is required to take two dimensions into consideration. --

Please substitute the paragraph beginning at page 12, line 11, with the following.

-- When the above-described OA detection system is thus used at a position detection position for detecting the position of the wafer, the wafer stage must be driven at the time of alignment measurement and at the time of exposure because the optic axis of the projection optics and the detection area of the OA detection system are spaced apart. Owing to a change in the environment in the vicinity of the wafer stage, therefore, alignment precision is affected by

fluctuation of the baseline. For example, the influence of fluctuation of the air varies depending upon a difference in interferometer length, thereby giving rise to interferometer measurement error. This causes a difference between the wafer drive grid at the time of exposure and the wafer drive grid at the time of alignment detection, thereby giving rise to a decline in alignment precision. --

Please substitute the paragraph beginning at page 15, line 17, and ending on page 16, line 2, with the following.

-- In a projection exposure apparatus that uses a KrF or <u>an</u> ArF excimer laser beam or <u>an</u> F_2 laser beam as illuminating light for the purpose of exposure, the adoption of a TTL-type alignment sensor is accompanied by a variety of technical difficulties. The off-axis alignment sensor having a high degree of freedom of design and potential functionality, therefore, takes on increased importance. However, in a case ~~where~~ <u>wherein</u> alignment is performed using the off-axis scheme, the precision of alignment will decline in comparison with alignment using the TTL scheme unless the effects of measurement error due to baseline fluctuation are mitigated, as mentioned above. --

Please substitute the paragraph beginning at page 16, line 3, with the following.

-- As set forth above, reducing in wavelength of the exposing light is effective in raising the resolution of the exposure apparatus, and adopting a reflection or a reflection-refraction optical system in order to achieve this reduction in wavelength. In addition, shortening the

baseline is effective in improving alignment precision. Further, reducing the size of the exposure apparatus is effective from the standpoint of lowering the cost of the semiconductor manufacturing facilities. There is no ~~prior-art~~ prior art system that offers all three of these features, namely, use of a reflection-refraction optical system as the projection optical system, shortening of the baseline and reduction in the size of the apparatus. --

Please substitute the paragraph beginning at page 17, line 15, with the following.

-- The so-called twin-barrel projection optical system disclosed in the specification of Japanese Patent Application Laid-Open No. 2001-15405 succeeds in raising resolution, but not in improving alignment precision. Even if the OA detection system disclosed in the specification of Japanese Patent Application Laid-Open No. 2000-91219 is incorporated, as in the manner of the above-described single-barrel scheme, the very fact that the arrangement has twin barrels results in an apparatus of a large size. --

Please substitute the paragraph beginning at page 17, line 25, and ending on page 18, line 14, with the following.

-- Further, the EUV exposure apparatus disclosed in the specification of Japanese Patent Application Laid-Open No. 11-345761 succeeds in raising the resolution of the exposure apparatus and in improving alignment precision, but has a projection optical system that itself is large in size. This results in a large-size apparatus. With regard to the improvement in alignment precision, the fact that the projection optical system is of a reflection type means that

the optical components constructed on the side of the wafer are mirrors. This system is realized by cutting away the portion through which the exposing light is transmitted. If the single-barrel reflection-refraction optical system is adopted, using mirrors for the optical components arranged on the side of the wafer poses difficulties in terms of optical design. As a consequence, the apparatus is limited to a case ~~where~~ <u>wherein</u> the reflection-type optical system is used. --

Please substitute the paragraph beginning at page 21, line 7, with the following.

-- The present invention further provides a semiconductor device manufacturing plant having a group of manufacturing equipment for <u>performing</u> various processes inclusive of any of the exposure apparatus described above, wherein information relating to at least one of the pieces of manufacturing equipment can be communicated by data communication using a local-area network and/or an external network outside the plant. --

Please substitute the paragraph beginning at page 22, line 14, with the following.

-- Fig. 2A is a diagram useful in describing the distance between the measurement center of an alignment sensor and the center of an exposure region in a case ~~where~~ <u>wherein</u> the present invention is applied; --

Please substitute the paragraph beginning at page 22, line 18, with the following.

-- Fig. 2B is a diagram useful in describing the distance between the measurement center of an alignment sensor and the center of an exposure region in a case ~~where~~ wherein the present invention is not applied; --

Please substitute the paragraph beginning at page 24, line 15, with the following.

-- According to a first embodiment of the invention, described below, note is taken of the fact that making the length of the baseline BL as small as possible is effective in mitigating the effects of measurement error caused by drift, and of the fact that it is possible to form the pattern image off-center with respect to the ~~optic~~ optical axis or lens barrel of the projection optical system. On the basis of these considerations, an off-axis-type alignment sensor is disposed on the side on which the pattern image is off-centered. --

Please substitute the paragraph beginning at page 26, line 14, with the following.

-- As a result, a usable region FR in Fig. 3, which is a region of the wafer W in which the pattern image of the mask R can be projected, is a semi-circular region within a circular region, the center of which is the optic axis AX of the projection optics. An exposure region ER upon which the pattern image of the mask R is actually projected and which is used in exposure of the wafer W is, e.g., a rectangular region within the semi-circular usable region FR. The region ER takes into consideration some leeway with respect to the wafer boundary relative to the optic axis AX. --

Please substitute the paragraph beginning at page 27, line 21, and ending on page 18, line 2, with the following.

-- Fig. 1 is a diagram schematically illustrating the overall structure of a projection exposure apparatus according to this embodiment of the present invention. In Fig. 1, the Z axis is taken as the direction of the normal to the wafer surface, the X axis is taken parallel to the plane of the drawing in the plane of the wafer, and the Y axis is taken perpendicular to the plane of the drawing. --

Please substitute the paragraph beginning at page 28, line 3, with the following.

-- In the projection optical system illustrated, the light emitted along the X direction from an F_2 laser (center wavelength of 157.6 nm) 1 is deflected in the z direction by a bending mirror 2, after which, a mask 4 is illuminated uniformly via an illuminating optical system 3. In Fig. 1, only one bending mirror 2 is illustrated on the optical path from the light source 1 to the illuminating optical system 3. In actuality, however, an optical system such as a light regulating optical system and a section for adjusting the quantity of light is disposed on the optical path. --

Please substitute the paragraph beginning at page 28, line 14, and ending on page 29, line 6, with the following.

-- Since an F_2 laser is being used as the light source, basically, a sealed structure is adopted to reduce absorption gas present along the optical path. The light source 1 and illuminating optical system 3 are connected by a casing C1. The connections have a hermetically

sealed structure. The casing C1 also is hermetically sealed and the space within the casing filled with an inert gas such as helium. It should be noted that the bending of the optical path is not limited to that shown in Fig. 1. A pattern to be transferred is formed on the mask 4, and the mask 4 is held on a mask stage 6 via a mask holder 5. The mask 4 has an illuminated rectangular region, the longitudinal direction of which is the Y direction. The mask stage 6 is movable in two dimensions along the plane of the mask by a drive system, not shown. The positional coordinates of the mask stage 6 are measured by a mask moving mirror 11 and interferometer 12, and the position of the mask stage 6 can be controlled based upon the result of the measurement. --

Please substitute the paragraph beginning at page 29, line 10, with the following.

-- The structure of the projection optical system 7 may be of the same type as that of the reflection-refraction optical system disclosed in, e.g., the specification of Japanese Patent Application Laid-Open No. 8-334695. This structure need not be described again. --

Please substitute the paragraph beginning at page 29, line 24, and ending on page 30, line 7, with the following.

-- The rectangular pattern image designed such that its longitudinal direction is the Y direction is formed on the wafer 8 so as to optically correspond to the rectangular illumination pattern that illuminates the mask 4. The wafer stage 10 is capable of being moved in two dimensions along the wafer plane by a drive system, not shown. The positional coordinates of

the wafer stage 10 are measured by a wafer moving mirror 13 and interferometer 14, and the position of the wafer stage 10 can be controlled based upon the result of the measurement. --

Please substitute the paragraph beginning at page 30, line 8, with the following.

-- In order to hold the interior of the projection optical system 7 in a hermetically sealed state, a plane-parallel plate P1 is disposed on the side near the mask 4 to provide a sealed structure. A lens Lr disposed on the side near the wafer 8 also has a sealed structure. The interior of the projection optical system 7 is filled with helium gas in order to reduce the absorption of the exposing light. Similarly, the optical path from the light source 1 to the illuminating optical system 3 also is filled with helium gas. The mask 4 and the mask stage 6 are placed inside a casing C2, the interior of which is filled with an inert gas such as nitrogen or helium. --

Please substitute the paragraph beginning at page 31, line 8, and ending on page 32, line 3, with the following.

-- Figs. 2A and 2B illustrate placement of the alignment sensor (mark detection system) and the vicinity of the wafer according to this embodiment. Fig. 2A shows a case where the present invention is applied and Fig. 2B a case where the present invention is not applied. In Figs. 2A and 2B, the lower drawing is an elevational view and the upper drawing is a plan view of the wafer. Fig. 2A shows a case where the alignments sensor 16 is placed on the side of the optic axis AX being the projection center of the projection optical system 7. A distance BL1

from the measurement center of the alignment sensor 16 to the center of the exposure region ER in this case is the baseline. On the other hand, Fig. 2B shows a case where the alignment sensor 16 is placed on the side of the region ER. The baseline in this case is BL2. By applying the present invention, the alignment sensor 16 can be disposed to shorten the baseline by the distance BL2 - BL1, which is the difference between the baseline quantities due to <u>the</u> position at which the alignment sensor 16 is placed. --

Please substitute the paragraph beginning at page 38, line 14, and ending on page 39, line 4, with the following.

-- In <u>the</u> case of an arrangement in which the projection optical system 24 is a reflection optical system or a reflection and refraction optical system where the number of times of the reflection light is an even number, and an intermediate image is formed within the projection optical system, the projection region of the reticle pattern formed on the wafer via the projection optical system and the mask illumination region on the reticle illuminated by the illuminating system 23 are formed at positions off-centered in the same direction with respect to the projection center of the projection optical system. Upon taking this into consideration, the reticle transport system and the wafer transport system are disposed on the side of the projection region and illumination region with respect to the projection center, thereby making it possible to reduce the size of the apparatus and <u>to</u> lower the initial and running costs of the manufacturing facilities. --

Please substitute the paragraph beginning at page 39, line 13, with the following.

-- The illuminating system 23 irradiates the reticle R, which is held on the reticle stage 26, with illuminating light of a predetermined wavelength. The illuminating light is guided to the illuminating system 23 from an F_2-laser light source 22. Examples of the illuminating light that can be mentioned are excimer laser light such as KrF, ArF and F_2 laser light, and higher-harmonic or i-ray ultraviolet light such as that of a YAG laser or metal vapor laser. The illuminating system 23 is a sealed or substantially sealed structure, the interior of which is filled with an inert gas, such as nitrogen or helium, the temperature and humidity ~~whereof~~ of which have been regulated. --

Please substitute the paragraph beginning at page 39, line 26, and ending on page 40, line 9, with the following.

-- The projection optical system 24 is a twin-barrel reflection-refraction optical system similar to the projection optical system disclosed in the specification of Japanese Patent Application Laid-Open No. 2001-27727. The projection optical system 24 is a sealed structure, the interior of which is filled with an inert gas, such as nitrogen or helium, the temperature and humidity ~~whereof~~ of which have been regulated. As shown in Fig. 7, the interior of the projection optical system 24 has an intermediate image surface P and two reflection surfaces. --

Please substitute the paragraph beginning at page 44, line 19, and ending on page 45, line 10, with the following.

-- For the spaces 69, 70, a circulation system is constructed by a coolant circulator, heat exchanger, air conditioner and blower fan, which are not shown, and thermometers 52, 54 in a manner similar to that of the space 72, and air is blown through the spaces 69, 70 via filters 47, 48, respectively. Unlike the space 71, the space 69 is connected to the space in which the reticle is irradiated and the space 70 is connected to the space in which the wafer is exposed. These spaces, therefore, are constructed as spaces in which an inert gas such as nitrogen is circulated. Accordingly, the air conditioning unit 36 is divided into a section for air conditioning the air that circulates through the space 71 and a section for air conditioning the inert gas that circulates through the spaces 69, 70. A return section 49 for circulation is constructed in the space 70 to construct a circulation path that is isolated from the air space 71. The space 69 also is provided with a similar return section, not shown. --

Please substitute the paragraph beginning at page 47, line 3, with the following.

-- By contrast, in Fig. 9B, to which the present invention is not applied, the reticle transport system 31 and the reticle alignment unit 29 are placed on the side of the optic axis X that is opposite to the illumination region RE. In accordance with this arrangement, the distance between the illumination region RE and reticle transport system 31 is LR1. --

Please substitute the paragraph beginning at page 48, line 20, and ending on page 49, line 4, with the following.

-- By contrast, in Fig. 10B, to which the present invention is not applied, the wafer delivery unit 35 and detection system 68 are placed on the side of the optic axis X that is opposite to the projection region WE. The distance between the detection system 68 and wafer delivery unit 35 is LW1, the same as in Fig. 10. However, the distance between the detection system 68 and projection region WE is BL3, which is longer than BL1 by twice the length of LWE, namely, the amount of off-centering of the projection region WE. This leads to an increase in the length of the baseline and invites a decline in alignment precision. --

Please substitute the paragraph beginning at page 49, line 5, with the following.

-- In Fig. 10C, to which the present invention is not applied, the detection system 68 is placed on the side of the projection region WE and the wafer transport system 33 and wafer delivery unit 35 are placed on the side of the optic axis X that is opposite to the projection region WE in order to avoid increasing the length of the baseline, which is the problem encountered in Fig. 10B. With this arrangement, the baseline will have a length that is the distance BL1, the same as in Fig. 10A. Further, since the detection system 68 and wafer delivery unit 35 are disposed on opposite sides of the optic axis X, the distance between the detection system 68 and the wafer delivery unit 35 is LW2. --

Please substitute the paragraph beginning at page 50, line 6, with the following.

-- More specifically, by adopting the arrangement shown in Fig. 10A, it becomes possible to arrange it so that the distance between the detection system 68 and the wafer delivery unit 35

is shortened and so is the travelling time to the observation position of the detection system 68. As a result, the throughput and productivity of the exposure apparatus are improved. --

Please substitute the paragraph beginning at page 51, line 7, with the following.

-- In the embodiment illustrated in Fig. 6, the reticle and wafer areas are disposed laterally in the plane of the drawing. However, it is possible for these areas to be disposed in a direction perpendicular to the plane of the drawing. In this case, also, the detection system and transport system would be disposed on the side on which the illumination region and projection region are present in a manner similar to the above embodiment, thereby making it possible to reduce the size of the apparatus. --

Please substitute the paragraph beginning at page 51, line 17, with the following.

-- Furthermore, as shown in the embodiment of Fig. 6, the space within the chamber can be used efficiently by disposing the reticle and wafer areas one above the other, making it possible to reduce the size of the apparatus. --

Please substitute the paragraph beginning at page 51, line 22, and ending on page 52, line 14, with the following.

-- In this embodiment, an example of which the present invention is applied to a scanning-type exposure apparatus has been illustrated. However, the invention is not limited to application to a scanning-type exposure apparatus and the same effects can be obtained even if

the invention is applied to a sequential-exposure-type exposure apparatus. Further, similar results can be obtained even if the invention is applied to an EUV exposure apparatus in which light of a wavelength of 5 to 15 nm in the soft X-ray region is used as the exposing light. For example, in an EUV exposure apparatus disclosed in the specification of Japanese Patent Application Laid-Open No. 11-219900, the projection optical system is of the reflection type. As a consequence, the reflection projection optical system has a lens barrel of a large diameter and an increase in the size of the apparatus is unavoidable. If the present invention is applied ~~so~~ to such an apparatus, the invention will be very effective in reducing the size of the apparatus. --

Please substitute the paragraph beginning at page 52, line 20, with the following.

-- [Embodiment of A Semiconductor Production System] --

Please substitute the paragraph beginning at page 52, line 21, and ending on page 53, line 4, with the following.

-- Described next will be an example of a system for producing semiconductor devices (e.g., semiconductor chips such as IC and LSI chips, liquid crystal panels, CCDs, thin-film magnetic heads and micromachines, etc.) utilizing the exposure apparatus described above. This system utilizes a computer network outside the semiconductor manufacturing plant to provide troubleshooting and regular maintenance of manufacturing equipment installed at the manufacturing plant and to furnish maintenance service such as the provision of software. --

Please substitute the paragraph beginning at page 53, line 5, with the following.

-- Fig. 11 illustrates the overall system as seen from a certain angle. The system includes the business office 101 of the vendor (equipment supplier) that provides the equipment for manufacturing semiconductor devices. Semiconductor manufacturing equipment for performing various processes used in a semiconductor manufacturing plant is assumed to be the manufacturing equipment. Examples of the equipment are pre-treatment equipment (e.g., lithographic equipment such as exposure equipment, resist treatment equipment and etching equipment, heat treatment equipment, thin-film equipment and smoothing equipment, etc., and post-treatment equipment (e.g., assembly equipment and inspection equipment, etc.). The business office 101 includes a host management system 108 for providing a manufacturing-equipment maintenance database, a plurality of control terminal computers 110, and a local area network (LAN) 109 for connecting these components into an intranet. The host management system 108 has a gateway for connecting the LAN 109 to the Internet 105, which is a network external to the business office 101, and a security function for limiting access from the outside. --

Please substitute the paragraph beginning at page 55, line 17, and ending on page 56, line 21, with the following.

-- Fig. 12 is a conceptual view illustrating the overall system of this embodiment as seen from an angle different from that depicted in Fig. 11. In the earlier example, a plurality of user plants each having manufacturing equipment are connected by an external network to the management system of the vendor that provided the manufacturing equipment, and information

concerning the production management of each plant and information concerning at least one piece of manufacturing equipment is communicated by data communication via the external network. In the example of Fig. 12, on the other hand, a plant having manufacturing equipment provided by a plurality of vendors is connected by an outside network to management systems of respective ones of the vendors of these plurality of pieces of manufacturing equipment, and maintenance information for each piece of manufacturing equipment is communicated by data communication. As shown in the drawing, the system includes a manufacturing plant 201 of the user of the manufacturing equipment (e.g., the maker of semiconductor device). The manufacturing line of this plant includes manufacturing equipment for implementing a variety of processes. Examples of such equipment are exposure equipment 202, resist treatment equipment 203 and thin-film formation equipment 204. Though only one manufacturing plant 201 is shown in Fig. 12, in actuality, a plurality of these plants are networked in the same manner. The pieces of equipment in the plant are interconnected by a LAN 206 to construct an intranet and the operation of the manufacturing line is managed by a host management system 205. --

Please substitute the paragraph beginning at page 56, line 22, and ending on page 57, line 13, with the following.

-- The business offices of vendors (equipment suppliers) such as an exposure equipment maker 210, a resist treatment equipment maker 220 and a thin-film treatment equipment maker 230 have host management systems 211, 221, 231, respectively, for performing remote maintenance of the equipment they have supplied. These have maintenance databases and

gateways to the outside network, as described earlier. The host management system 205 for managing each piece of equipment in the manufacturing plant of the user is connected to the management systems 211, 221, 231 of the vendors of these pieces of equipment by the Internet or leased-line network serving as an external network 200. If any of the series of equipment in the manufacturing line malfunctions, the line ceases operating. However, this can be dealt with rapidly by receiving remote maintenance from the vendor of the faulty equipment via the Internet 200, thereby making it possible to minimize line downtime. --

Please substitute the paragraph beginning at page 58, line 21, with the following.

-- (Process for manufacturing <u>a</u> semiconductor device) --

Please substitute the paragraph beginning at page 58, line 22, and ending on page 59, line 23, with the following.

-- A process for manufacturing a semiconductor device utilizing the production system set forth above will now be described. Fig. 14 illustrates the overall flow of a process for manufacturing semiconductor devices. The circuit for the device is designed at step 1 (circuit design). A mask on which the designed circuit pattern has been formed is fabricated at step 2 (mask fabrication). Meanwhile, a wafer is manufactured using a material such as silicon or glass at step 3 (wafer manufacture). The actual circuit is formed on the wafer by lithography, using the mask and wafer that have been prepared, at step 4 (wafer process), which is also referred to as "pre-treatment". A semiconductor chip is obtained, using the wafer fabricated at step 4, at step 5

(assembly), which is also referred to as "post-treatment". This step includes steps such as actual assembly (dicing and bonding) and packaging (chip encapsulation). The semiconductor device fabricated at step 5 is subjected to inspections such as an operation verification test and a durability test at step 6 (inspection). The semiconductor device is completed through these steps and then is shipped (step 7). The pre- and post-treatments are performed at separate special-purpose plants. Maintenance is carried out on a pre-plant basis by the above-described remote maintenance system. Further, information for production management and equipment maintenance is communicated by data communication between pre- and post-treatment plants via the Internet or leased-line network. --

Please substitute the paragraph beginning at page 59, line 24, and ending on page 60, line 20, with the following.

-- Fig. 15 is a flowchart illustrating the detailed flow of the wafer process mentioned above. The surface of the wafer is oxidized at step 11 (oxidation). An insulating film is formed on the wafer surface at step 12 (CVD), electrodes are formed on the wafer by vapor deposition at step 13 (electrode formation), and ions are implanted in the wafer at step 14 (ion implantation). The wafer is coated with a photoresist at step 15 (resist treatment), the wafer is exposed to the circuit pattern of the mask to print the pattern onto the wafer by the above-described exposure apparatus at step 16 (exposure), and the exposed wafer is developed at step 17 (development). Portions other than the developed photoresist are etched away at step 18 (etching), and unnecessary resist left after etching is performed is removed at step 19 (resist removal). Multiple

circuit patterns are formed on the wafer by implementing these steps repeatedly. Since the manufacturing equipment used at each step is maintained by the remote maintenance system described above, malfunctions can be prevented and quick recovery is possible if a malfunction should happen to occur. As a result, the productivity of <u>the</u> semiconductor device manufacture can be improved over the prior art. --

Please substitute the paragraph beginning at page 61, line 1, with the following.

-- Further, in accordance with the present invention, <u>the</u> baseline length can be shortened while using a reflection-refraction-type projection optical system. As a result, resolution can be raised by reducing the wavelength of exposing light and alignment precision can be improved by shortening the baseline. Furthermore, the apparatus can be reduced in size and it is possible to lower the initial and running costs of the production facilities. Further, in accordance with the present invention, it is possible to provide an exposure apparatus having improved throughput and high productivity. --